

Spot Safety Project Evaluation

Project Log # 200512170

Spot Safety Project # 10-00-204

**Spot Safety Project Evaluation of the Flashing Traffic Signal Installation
at the Intersection of SR 2139 (Griffith Rd) and SR 2146 (Plyler Mill Rd)
Union County**

Documents Prepared By:

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Date

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Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 10-00-204 – The Intersection of SR 2139 (Griffith Rd) and SR 2146 (Plyler Mill Rd), Union County

Introduction

In an attempt to assess the safety of our roads, the Safety Evaluation Group of the Traffic Safety Systems Management Section has evaluated the above project. The methodologies used in this evaluation offer various philosophies and ideas, in an effort to provide objective countermeasure crash reduction results. A naive before and after analysis and an Odds Ratio comparison analysis of the treatment data has been completed to measure the effectiveness of the spot safety improvement. This information is provided to you so the benefit or lack of benefit for this type of project can be recognized and utilized for future projects.

Project Information and Background from the Project File Folder

The spot safety project improvement countermeasure chosen for the subject location was the installation of an overhead flashing traffic signal. SR 2139 (Griffith Rd) and SR 2146 (Plyler Mill Rd) are both two-lane facilities with no left turn lanes. The speed limit at the subject location is 55 mph for all approaches. The subject location is a four-leg intersection, which is controlled by stop signs on SR 2139. In addition, there are “Stop Ahead” signs and “Stop Ahead” pavement markings on the SR 2139 approaches.

There were a total of 9 crashes reported during the initial study from 10/1/1996 to 10/1/1999. Of these, 7 were considered “correctable” by the chosen countermeasure. The final completion date for the flashing traffic signal installation at the subject intersection was on April 26, 2001, with a total cost of \$5,000.

Comparison Analysis

After reviewing the spot safety project file folder along with all the crashes at the subject location, the crash data omitted from this analysis to consider for an adequate construction period was from March 1, 2001 to May 31, 2001. The before period consisted of reported crashes from November 1, 1996 through February 28, 2001 (4 Years 4 Months) and the after period consisted of reported crashes from June 1, 2001 to September 30, 2005 (4 Years 4 Month). The ending date for this analysis was determined by the available crash data at the time the crash analysis was conducted.

The analysis consisted of two different sets of data, the treatment and the comparison data. The treatment data consisted of all crashes within 150 feet of the subject intersection. The comparison data consisted of all crashes within 150 feet of the intersection of SR 2139 (Griffith Rd) and SR 2180 (West Sunset Dr.). Please see attached *Location Map* for further detail. The following data table depicts the Naive Before and After Analysis for the treatment and comparison intersections.

Please note that Frontal Impact Crashes were the target crashes for the applied countermeasure. The Frontal Impact Crash types considered are as follows: Left turn, same roadway; Left turn, different roadways; Right turn, same roadway; Right turn, different roadways; Head on; and Angle.

<u>Treatment Information</u>			
	Before	After	Percent Reduction (-) Percent Increase (+)
Total crashes	9	9	0.0
Total Severity Index	5.11	3.47	-32.1
Frontal Impact Crashes	8	8	0.0
Frontal Severity Index	5.62	3.77	-32.9
Volume	3600	4500	25.0
<u>Comparison Information</u>			
	Before	After	Percent Reduction (-) Percent Increase (+)
Total crashes	9	12	33.3
Total Severity Index	3.47	2.85	-17.9
Frontal Impact Crashes	6	7	16.7
Frontal Severity Index	3.47	3.11	-10.4
Volume	7050	8850	25.5
<u>Odds Ratio: Treatment versus Comparison</u>			
	Before	After	Percent Reduction (-) Percent Increase (+)
Treatment Total Crashes	9	9	-25.0
Comparison Total Crashes	9	12	---
Treatment F.I. Crashes	8	8	-14.3
Comparison F.I. Crashes	6	7	---

The naive before and after analysis at the treatment location resulted in no change for both Total Crashes and Frontal Impact Crashes and a 25.0 percent increase in Average Daily Traffic (ADT). The comparison locations experienced a 33.3 percent increase in Total Crashes, a 16.7 percent increase in frontal crashes, and a 25.5 percent increase in ADT. The before period ADT year was 1998 and the after period ADT year was 2003.

The Odds Ratio is used as another means of calculating the treatment effect. The number of crashes in the before and after period from the Comparison are used to calculate the percent reduction in crashes for the Treatment Intersection. As shown in the previous table, using the Odds Ratio calculation, there is a 25.0 percent decrease in Total Treatment Intersection crashes and a 14.3 percent decrease in Frontal Impact crashes.

Results and Discussion

The naive before and after analysis involving the comparison of treatment actual before data versus treatment actual after data resulted in no change for both Total Crashes and Frontal Impact Crashes. Using the Odds Ratio to calculate the treatment effect resulted in a 25.0 percent decrease in Total Crashes and a 14.3 percent decrease in Frontal Impact Crashes. The summary results above demonstrate that the treatment location appears to have had no change in both Total Crashes and Frontal Impact Crashes from the before to the after period, although the ADT has increased. However, when using the Odds Ratio to measure the treatment effect there appears to be a reduction in both Total Crashes and Frontal Impact Crashes.

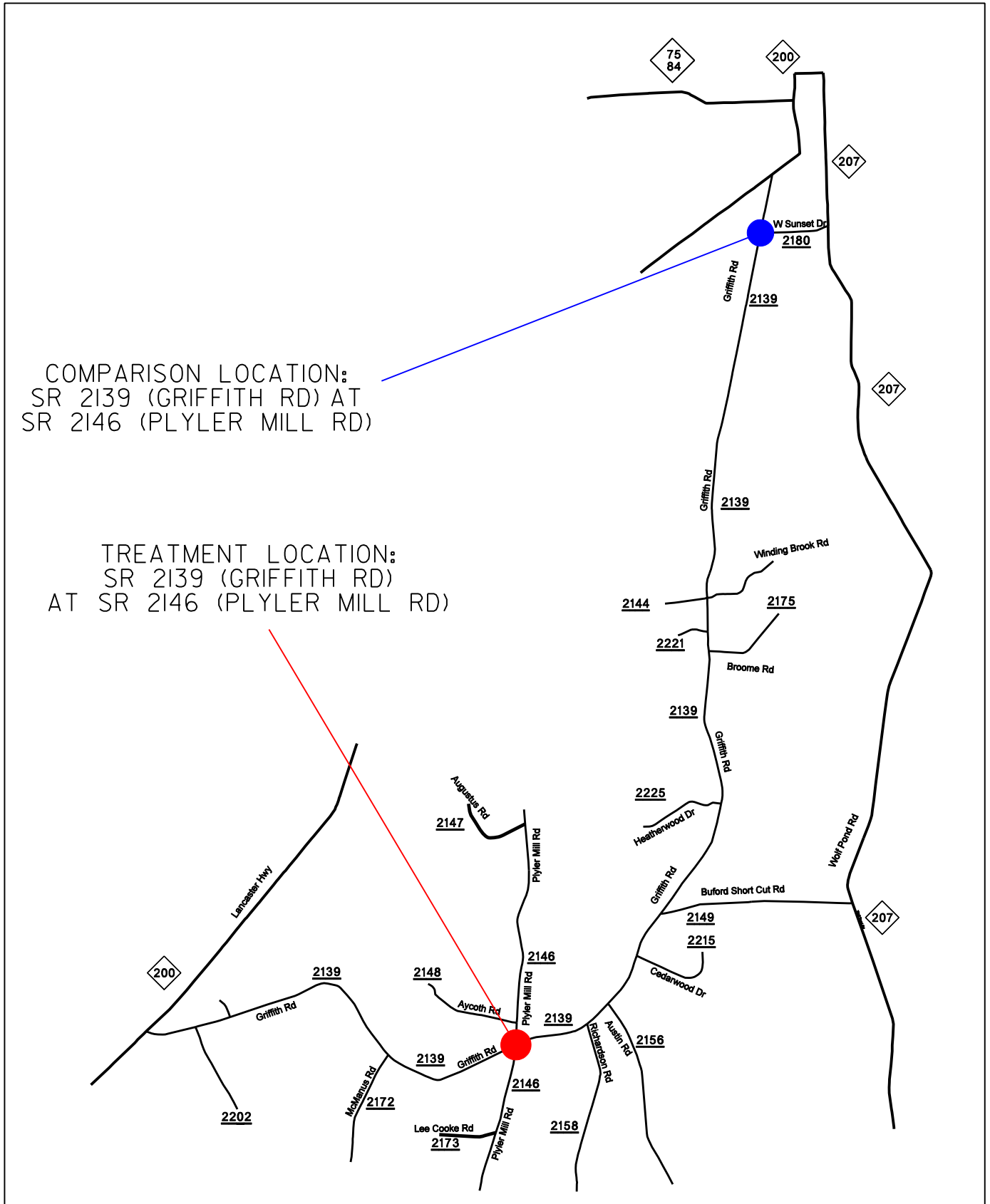
Referencing the *Collision Diagrams*, the most significant pattern of crashes in the before period appears to be angle crashes involving vehicles travelling from the eastern leg of SR 2139 and the northern leg of SR 2146. This crash pattern remained constant from the before to the after period. There does not appear to be a site distance deficiency in the road design, although there is a utility pole obstructing site distance looking right from the eastern leg of SR 2139 (See *Treatment Site Photos*). The photos also show a temporary sign attached to the utility pole further obstructing site distance. It is not known if signs are regularly attached here.

In the before period, there was only one crash caused by a running of the stop sign, which involved a vehicle travelling east on SR 2139. In the after period, there was also one crash caused by a running of the stop sign, this time involving a vehicle travelling west on SR 2139. Both crashes occurred in the daytime with no reason for the running of the stop signs given. Referencing the *Treatment Site Photos*, the stop condition is clearly visibly from both legs for a significant distance.

Please see the attached *Treatment Site Photos*. Photos are provided for all four legs of the intersection, as well as site distances for both legs of SR 2139.

The countermeasure crash reduction for Total Crashes at the subject intersection can be in the range of a 0.0 to 25 percent decrease in crashes. The countermeasure crash reduction for Frontal Impact Crashes at the subject intersection can be in the range of a 0.0 to 14.3 percent decrease in crashes. As the Safety Evaluation Group completes additional spot safety reviews for this type of countermeasure, we will be able to provide objective and definite information regarding actual crash reduction factors.

Location Map Union County Evaluation of Project # 10-00-204



Treatment Site Photos Taken 2/16/2006



Travelling East on SR 2139 (Griffith Rd)



Travelling West on SR 2139 (Griffith Rd)



Travelling North on SR 2146 (Plyler Mill Rd)



Travelling South on SR 2146 (Plyler Mill Rd)



Site Distance from Western Leg of SR 2139



Site Distance from Western Leg of SR 2139



Site Distance from Eastern Leg of SR 2139



Site Distance from Eastern Leg of SR 2139. Note the Sign Attached to the Utility Pole Obstructs Site Distance

